

ICT REVOLUTION: SOME REVERBERATIONS

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Introduction

This short paper touches on some of the reverberations the Information Communication Technologies (ICT) Revolution has set off. It is more of a kick start for our discussions than a compressive analysis of the subject.

When the Agrarian Revolution took place, no one recognized it as a revolution while it was underway, not even for centuries afterward. The Industrial Revolution, again, was not called a revolution while it was coursing through the entire Western world, but only in late 19th century, after seeing the effects of revolutionary changes in the industrial landscape. The ICT Revolution has the distinction of being recognized as one even as it was unfolding. The magnitude and the impact of this phenomenon have come to be felt widely and quickly the world over. But for the same reason, the judgments about this revolution are often rushed and unrigorous.

Though the first commercial computer was produced in the early 1950s, the widespread use of computers and the consequent Information Communication Technology did not come into common use till about 1980s. Internet came into public use only in the 1990s. But, once ICT put out its roots in the key domains of our collective life such as academia, government and business there was no stopping of its tentacles reaching into every aspect of our life, whether at work, at play or at home.

However, the spread of ICT through the world has not been even or equitable. ICT has added one more layer of division between the haves and the havenots, leading to a Digital Divide. The world is now struggling to cope with a technology that has tremendous potential as a boon but with its own attendant threats of a bane.

The ICT Revolution has not merely given technological tools to boost innovation and productivity but to a much larger and deeper articulation of how humankind should live as a society. As with the Agrarian Society and the Industrial Society, ICT has led many to dream of an Information Society. Visions of Information Society have been articulated not only by the technologically advanced nations but even by the developing world, as evident in Africa, South America and Asia. Poor countries actually see ICT as an opportunity to leapfrog over generations of technologies to cope with their persistent economic and social ills.

As UN Secretary General Kofi Annan pointed out "it is precisely where no infrastructure exists that (ICT) can be particularly effective, helping people to

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leapfrog generations of telecommunication technology and infrastructure and empower people.”

Let's first look at some specific domains in which ICT has had its greatest impact.

Impact on Innovation & Productivity

The reports on the effect of ICT on innovation and productivity are mixed. Some evangelists had extolled the virtues of ICT and predicted all sorts of innovations and productivity gains, much of which are yet to be realized. On the other hand, the luddites continue to claim that ICT has made little or no difference. The truth seems to lie, as usual, somewhere in between.

An OECD report, released in 2003, concludes that “all the evidence suggests that ICT remains a major positive dynamic force in OECD countries...and an important driver of growth and productivity.”¹ The report also identifies a number of factors that will enhance the positive effects of ICT. These include not only continuous investment in ICT development and deployment, but also policy frameworks that are conducive to investment and competition, upgrading of related skills and major organizational changes.

The above factors are not confined to the experiences of OECD countries. An IMF Working Paper², also released in 2003, reports that ICT's contribution to growth in Asian economies is clear and especially significant in the second half of 1990s. One important note in this report is that ICT's contribution is much more evident in capital deepening and labour productivity but less so in Total factor Productivity (TFP).

But, it is also clear from the Asian report that Asia (ex-Japan) lags far behind US, the leader in ICT. For example, between 1992 and 1999, total spending on ICT capital and services in key Asian economies³ (other than Japan) was about 14% of that in US and 30% of Japan's spending.

The report also emphasises a common trend in ICT development and impact almost everywhere it has spread: “The effects of such revolutions have generally occurred in three main stages. First, technological changes raises productivity growth in the innovating sector; second, falling prices encourage capital deepening; and, finally, there can be significant reorganisation of production around capital goods that embody technology. “ What this finding leads to is the probability that the bulk of the benefits from ICT in Asia will emerge in the future. Thus, it is still too premature to pass a final judgment.

¹ “Seizing the benefits of ICT in a digital economy”, OECD, 2003

² Il Houg Lee & Yougesh Khatri, “Information technology and productivity growth in Asia,” IMF Working Paper 03/15, 2003

³ China, Indonesia, Hong Kong, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand

Asian Choices & Challenges

Asia, which still includes a lot of developing countries, faces complex challenges in the choice technologies it should adopt. For example, in many old urban centres, government agencies or government-run corporations have long monopolised the telecommunication sector and have invested heavily in the old wired networks. For these networks to be replaced either by fibre or by wireless networks will prove to be enormously costly, partly because of the disruption of services and partly because of the cost of replacing existing equipment. On the other hand, a poor district which never had any telecommunication facilities in the first place could leapfrog to the latest technology available without much disruption and at relatively reasonable cost. What is also noteworthy is that the new ICT facilities can be installed by the private sector, made more efficient by competition, rather than by state organisations.

On the other side of the coin, some Asian governments are at the forefront of pushing the new technologies, by liberalising the telecommunication market, providing government support, modifying the regulatory regime and by encouraging private sector participation and competition. South Korea, Singapore and Malaysia are good examples of such developments. However, even with liberalisation there are many instances of incumbent companies still dominating the sector and preventing or marginalising new entrants. Statistics show that in 2002, incumbents controlled more than 80 percent of broadband access market in OECD and more than 90 per cent in EU. In Asia, the same story seems to repeat itself.

However, the bottomline for Asia is that it cannot afford to be left behind in the onward march of ICT innovation and deployment. Japan, South Korea and Singapore, the leading ICT countries in Asia, have demonstrated the benefits of both government planning and private sector participation in the ICT sector. Those that lag behind need to ramp up quickly if they too want to taste the fruits of the ICT Revolution.

Impact of Broadband

One of the key elements of ICT is “broadband,” a platform that brings together three converging ICT sectors: computing, communications and broadcasting. Broadband takes internet several notches above the “dial-up” technology it started with.

At present only one in ten internet subscribers in the world have broadband connection. In total there are around 63 million broadband subscribers compared with 1.13 billion fixed-line users and 1.6 billion mobile phone users. But in South Korea, the broadband leader of the world, more than nine out of ten have such connectivity.

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Broadband is opening up new opportunities for interactive applications, online games, virtual reality, digital broadcasting, to name just a few.

But, broadband is not without its attendant problems. For example, it is going to increase the tensions that already exist between owners of Intellectual Property Rights and those set on infringing them through new technologies. If the earlier slow speed internet could allow the Napster-type downloads of individual songs, now whole albums and movies could be downloaded in seconds or minutes. The music industry alone claims a loss of 7% of its income in 2002, due to illegal downloading of music.

Governments promote broadband not only for economic gains but also for its own governance reasons. Broadband makes E-Government much more viable by enabling the provision of numerous e-services for the public including education, health and other government services.

Singapore provides a good example of how broadband has enabled E-Government developments. This is how the government envisions its future: "By 2006, an e-lifestyle will be prevalent in Singapore. Both individuals and businesses prefer to transact online with the Government. Citizens readily provide feedback and actively contribute to the policy review process through electronic consultations and virtual communities. A vibrant infocomm industry works closely with the Government to transform work processes and service delivery through Infocomm Technology (ICT)."⁴

It is a vision that will make it a leading e-Government to better serve the nation in the digital economy. The focus is "to transform the Public Service into a Networked Government that delivers accessible, integrated and value-added e-services to our customers, and helps bring citizens closer together."

Many other countries in Asia are looking to good e-government models including Singapore, US and Canada. However, the political, economic and social environments in much of Asia are so diverse that no single model will serve as an object lesson for all of them. Perhaps each will have to adopt and adapt good models or elements of them to suit their individual environments. This would be one of the biggest challenges for the state in this era of ICT Revolution.

Digital Divide

Some participants at the recent World summit on Information Society (WSIS) argued that "access to information is primarily determined by three elements:

⁴ http://www.egov.gov.sg/egovt_action_planii.htm

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connectivity, capability and content. Many lack connectivity and this is still considered the biggest challenge to the development of the information society.”

It used to be said that Tokyo has more telephones than the whole of Africa. That was true 20 years ago but now there are more than twice as many telephone lines in Africa as in Tokyo. According to one report, by the end of 2001, 28 African nations had more mobile than faxed subscribers, a higher percentage than any other continent!⁵ On the other hand, there is a growing divide in the quality of ICT availability. For example, the 400,00 citizens of Luxembourg are reported to share among them more international internet bandwidth than Africa’s 760 million citizens. The new digital divide is now about quality, not just quantity.

It has also been pointed out that less than one per cent of the world’s inhabitants had access to a mobile phone in 1991 and only one third of countries had a cellular network. By the end of 2001 – in just ten years – over 90% of countries had a mobile network and almost one in every six of the world’s inhabitants had a mobile phone.

As the World Telecommunication Development Report 2002 points out, the Least Developed Countries (LDCs) “surpassed the psychological threshold of one telephone user per 1000 inhabitants during 2001. This is an unmistakable sign that the digital divide is being reduced, albeit at too slow a pace.”⁶

While the quantitative divide is shrinking, qualitative digital divide may increase if corrective actions are not taken. Such efforts will need the concerted and collective efforts of government, development agencies and the private sector.

Some observers have noted that the developed countries could be especially helpful by, for example, funding grass roots projects to harness ICTs to improve the likelihood of local communities, incubating developing nations dot.coms and by facilitating international connectivity to internet.

But this is a two way street. Observers have also suggested that developing country governments must also play their part by adopting appropriate national ICT strategies based on private sector participation, market liberalisation and independent regulation and by developing universal access policies.

In 1984, the Commission for Worldwide telecommunications Development, headed by Sir Donald Maitland, published the *Missing Link* Report. The main point of the report was that the lack of telecommunication infrastructure in developing countries impeded economic growth. The Maitland report made a plea that all of humanity be brought into the reach of a telephone by the end of the century.

⁵ World Telecommunication Development Report 2002: Reinventing Telecoms, ITU, 2000

⁶ *Op cit*

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As part of the Millennium ICT Goals, some new and specific targets have been set. These include:

For high and upper middle income economies -- more than 90% household telephone penetration; more than 50% household PC penetration; and more than 50% household internet penetration.

For lower-middle and low income economies -- more than 90% mobile population coverage.

One key difference in the two sets of goals is that for the first category the emphasis is on *universal service* while for the latter it is *universal access*.

For some comparisons, in 2000, Iceland was the leader with 98% telephone penetration, 61% PC penetration and 51% internet penetration. Singapore was a close second with 98%, 61% and 50% respectively. South Africa scored 33%, 25% and 5% respectively.

Governance in Cyberspace

When internet first exploded into public space in the 1990s, there was an overwhelming sense that this was a unique medium – it was uncontrolled and uncontrollable by anyone, any firm or even any state. Internet was deemed to have created a cyberspace that was borderless and leaderless – it was truly for the people, by the people and of the people. However, this early euphoria has now given way to more sober judgments that acknowledge the inexorable pressures by states and corporations to gain greater control of the cyberspace. 9/11 has, as it has in so many other cases, added urgency and further impetus to the debates over who controls the cyberspace. When America stirs, all other countries shudder.

It is interesting that the US Government, which actually initiated internet as a defence mechanism, seemed to lose total control of it for a while and now seems to be coming back with a vengeance in its attempt to exert control over it. But this is not just an American phenomenon. The Council of Europe has indeed taken the lead in drafting the first international Cybercrime Treaty in 2001 and has been pushing for its ratification since. The treaty is designed to establish international criminal standards related to copyright infringement, online fraud, child pornography and network intrusions, with provisions for policing the internet both within and across national borders. Civil libertarians, of course, condemned it as a violation of individual's privacy.

And, it is not just states that are putting "borders" on the borderless world of cyberspace. Even private sector actors are trying to impose borders, though for very different reasons. AOL, which owns a gigantic database of "names and

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presences” linked to its AIM instant messenger service, has imposed a “security” cordon around this namespace, which makes it impenetrable to other instant message operators. More recently, Microsoft has introduced a digital passport for all its netizens which, in effect, will make its own system impenetrable to other such systems. Thus, there are both state inspired “Big Brothers” and private sector initiated “Big Brothers” in the cyberspace, not to mention numerous “Little Brothers” trying to snoop on and control all kinds of internet users.

However, such controlling attempts are not being accepted as inevitable or unstoppable by all users. There is a counter-culture in the cyberspace that is fighting back in a “spy versus spy” mode. Controlling technologies are being challenged by liberating technologies in this cyberwar. The jury is still out on who will be the final victor.

The internet has also brought about a hybrid governance system that is probably unique – Private Governance Arrangements by the Alternative Governance Organisations, the AGOs.. Internet Corporation for Assigned Names and Numbers (ICANN), The Internet Engineering Task Force (IETF) and World Wide Web Consortium (W3C) are three examples of private, international AGOs that actually lord over the cyberspace through their technical expertise to make rules, to set standards and to act as advisors. They are not at all accountable to the public at large and yet they wield enormous power and make far reaching decisions.

There is another form of control that often escapes the attention of many critics – the “code” (software, hardware and network design) as an instrument of regulation in cyberspace. Larry Lessig, a thought leader on ICT issues, has argued that code is in fact less amenable than law to resistance by individuals and to the oversight by democratic institutions.⁷ Most ICT users are not technically savvy to take on the code makers which are mostly giant firms with financial as well as technological muscle to get what they want.

Thus the issue of who governs cyberspace continues to be a hotly debated question and there is no emerging consensus anywhere in sight.

Conclusion

The foregoing are snippets of issues that exercise the minds of those trying to cope with the ICT Revolution. As a revolution that is still unfolding and as a force that affects every aspect of our life, the ICT Revolution is a Work In Progress. Easy conclusions at this stage will prove to be as untenable as the easy predictions that were made when this revolution first appeared at the horizon.

⁷ Lawrence Lessig, Code and Other Laws of Cyberspace, Basic Books, 2000